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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF  
STACHEW ET AL.

DOCKET No.: 2964R

SERIAL No.: 09/659,132

EXAMINER: J. JOHNSON

FILED: SEPTEMBER 11, 2000

GROUP ART UNIT: 1764

TITLE: MODIFIED POLYISOBUTYLENE SUCCINIMIDE DISPERSANTS HAVING  
IMPROVED SEAL, SLUDGE, AND DEPOSIT PERFORMANCE

Wickliffe, Ohio  
Dated: March 26, 2003

Hon. Commissioner of Patents and Trademarks  
Washington, DC 20231

Sir:

APPEAL BRIEF

(1) Real Party in Interest.

The application is assigned to The Lubrizol Corporation.

(2) Related Appeals and Interferences.

None. A continuation-in-part application was filed on March 3, 2003; no office action has been received as of this date.

(3) Status of Claims.

Claims 1-28 are finally rejected.

(4) Status of Amendments.

The Examiner indicated that the amendments submitted on January 8, 2003 would be entered for purposes of appeal. Thus, claims 1 and 28 are now three-times amended.

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upon filing.

The amendment to the text on page 6 restores the text to the original condition as it was

I certify that this correspondence is being deposited with the United States Postal Service as ☒ first class ☐ express mail in an envelope addressed to: Hon. Commissioner of Patents and Trademarks, Washington, DC 20231, on:

By: Shirley E. Kelly Date: 3/26/03 [Exp. Mail # \_\_\_\_\_]

(5) Summary of Invention.

The present invention relates to a lubricating composition, especially for lubricating an internal combustion engine [page 1]. Beside the conventional oil of lubricating viscosity [pp. 3-5], the composition comprises a minor amount of a select nitrogen-containing dispersant [1]. The dispersant is the reaction product of a hydrocarbyl-substituted acylating agent [6-12] and a polyamine [14-19] (each of which components is in a generic sense known in the art). The dispersant is distinguished from the prior art, however, in that the two of the components of the dispersant are specially selected. The hydrocarbyl substituent (that is, an alkyl group, etc.) is selected such that 15 to about 20 mole percent of the substituents have a molecular weight of less than 500 [6] (the remainder of the hydrocarbyl substituents will have a molecular weight of greater than 500). Moreover, the polyamine component (which may be of either of two known types, (a) or (b)) is selected such that no more than about 20 mole percent of the molecules thereof contain 6 or fewer nitrogen atoms [15]. That is to say, the dispersant is prepared so as to contain a reduced amount of lower amine component and a reduced – but not excessively reduced – amount of low molecular weight hydrocarbyl component in the substituent, compared to most conventional dispersants.

The composition of the present invention reduces the amount of soot or sludge formation [23] when the lubricant is used for an internal combustion engine, and also reduced the degradation of elastomer seals [22-24] in such an engine.

(6) Issue.

Whether the limitation to “15 to about 20 mole percent” in part (I) of claims 1 and 28 finds adequate support in the specification as filed.

(7) Grouping of Claims. The claims stand or fall together.

(8) Argument.

The only issue remaining in this case is whether the limitation of “15 to about 20 mole percent” in part (I) of claims 1 and 28 finds adequate support in the specification, that is, whether or not specifically the recitation of the lower limit of “15” constitutes new matter. The value of 15 was introduced to the claims by way of amendment.

As originally filed, claims 1 and 28 indicated that "no more than about 20 mole percent of the individual molecules thereof have a hydrocarbyl substituent with a molecular weight of less than 500." The original claims were rejected by the examiner over various references, the most pertinent of which disclosed a dispersant having a hydrocarbyl substituent in which "less than about 10%" of the groups had the specified low molecular weight. To distinguish from this reference, applicants entered the "15 to about 20 mole percent" limitation and presented experimental evidence of unexpectedly superior performance within the narrower range. In response, the examiner withdrew the rejection based on the prior art. However, the examiner rejects the claims under 35 U.S.C. § 112, first paragraph, for the recitation of subject matter that was allegedly "not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention," specifically with regard to the introduction of the value of "15" into the claims.

The following is a quotation from the specification, page 6, with the language at issue underlined:

The substituted succinic acylating agents are those which can be characterized by the presence within their structure of two groups or moieties. The first group or moiety is referred to herein, for convenience, as the "substituent group(s)" and is derived from a polyalkene. The polyalkene from which the hydrocarbyl-substituent groups are derived is characterized by a  $\overline{M}_n$  (number average molecular weight) value. Since the substituent as a whole is normally a mixture of individual chains of varying lengths, these substituent groups are characterized by having not more than 20 mole percent, preferably not more than 15 mole percent and most preferably not more than 10 mole percent of individual substituent chains with a  $\overline{M}_n$  of less than 500. Typically the substituent groups as a whole will have a  $\overline{M}_n$  value of 1000 to 10,000, preferably 1300, 1500, or 2000 to 5000. Most preferably the  $\overline{M}_n$  is at least 2000. In another highly favored embodiment, the substituent groups will contain not more than 5 mole percent of substituent groups which have a  $\overline{M}_n$  of below 300.

A standard for assessing added language regarding range limitations is whether one skilled in the art would consider it inherently supported by the discussion in the original disclosure. (MPEP 2163.05 III, citing *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).) If alternative elements are positively recited in the specifica-

tion, they may be explicitly excluded in the claims. (MPEP2173.05(i), citing *In re Johnson*, 558 F.2d 1008, 1019, 194 USPQ187, 196 (CCPA 1997).)

Examining the language of the present claims and comparing it with the original disclosure, it is respectfully submitted that the presently claimed range limitation is proper. The originally filed specification, on page 6, explicitly discloses three ranges for the molar amount of substituents having  $\overline{M}_n$  below 500, namely: "not more than 20 mole percent," that is,

0-20% and

0-15% and

0-10% .

Thus, from within the initial range of 0-20%, a narrower range of 0-15% was named, leaving, by exclusion, a remaining range of 15-20%. It is now this implicit range that is being claimed.

Additional support for a numerical value of 15 mole percent is found in Table I on page 11, where 15.0 mole percent of the stripped polyisobutene used in preparing the dispersant has a  $\overline{M}_n$  of less than 500, as claimed [emphasis added]:

Unstripped Polyisobutene			Stripped Polyisobutene	
$\overline{M}_n$	weight %	mole %	weight %	mole %
<300	1.6	14.3	0.4	3.9
<b>&lt;500</b>	3.7	25.3	2.4	<b>15.0</b>
500-1000	6.8	18.8	7.0	21.7
<1000	10.6 <sup>a</sup>	44.1	9.4	36.7
1000-1500	8.9	14.7	9.8	17.8
1500-2000	9.6	11.2	8.7	11.3
>2000	70.9	30.0	72.1	34.2

The Examiner has objected that the specification "teaches away" from the upper limit of the original range, that is, 15-20%. It is true that originally it was disclosed that the lower portions of the claimed range, such as less than 15%, were preferred. However, pointing out certain ranges, or even indicating that they are preferred, does not constitute an abandonment of, or a teaching away from, other ranges that are not so designated. The Examiner also argues that the principle of *Johnson* is inapplicable because it arose in the

context of excluding species lost from an interference count. That specific context, however, would not seem to be particularly relevant. In fact, *Johnson* discovered that a part of his originally claimed range was unpatentable, and retreated to an otherwise patentable species. That is what the present Applicants wish to do. "[The] specification, having described the whole, necessarily described the part remaining." (*Johnson*, at 194 USPQ 197). The specification of *Johnson* did disclose numerous species within the remaining portion, which is a point of possible difference from the present specification, but the present specification does provide an example at exactly the 15% cutoff limit. The 15% value and 20% value provide reasonable bounds for defining a patentable portion of Applicant's invention. "That what appellants claim as patentable to them is *less* than what they describe as their invention is not conclusive if their specification also reasonably describes that which they do claim" (*In re Wertheim*, 191 USPQ 90 at 97). It is submitted that this standard of reasonable description is met.

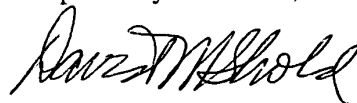
It is noted that the Applicants had offered to amend the language on page 6 to explicitly recite the claimed range of 15 to 20%. It was not and is not believed that this is necessary, since there is adequate support in the specification as it stands. Rather, the amendment was offered in order to remove any possible formal objection to lack of explicit language in the specification corresponding to that of the claims. Applicants remain open to this type of amendment if it should be deemed desirable.

Conclusion. For the foregoing reasons it is respectfully submitted that the present claims are fully supported by the text of the application as filed, and therefore that all claims should be allowed. Therefore it is requested that the Examiner's rejection of claims 1 - 28 be reversed.

(9) Appendix. A clean copy of claims 1-28, double spaced, is attached as an appendix hereto.

(8) Fee. Please charge the fee for submitting an appeal brief (believed to be \$320) to Deposit Account No. 12-2275 (The Lubrizol Corporation). Any deficiency or overpayment in fees should be charged or credited to this same deposit account.

Respectfully submitted,



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2964R

What is claimed is:

1. (three times amended) A composition suitable for reducing engine sludge and degradation of elastomer seals comprising

a major amount of an oil of lubricating viscosity and

a minor amount of a nitrogen-containing dispersant wherein the nitrogen containing dispersant is a reaction product of

(I) a hydrocarbyl-substituted succinic acylating agent, wherein 15 to about 20 mole percent of the individual molecules thereof have a hydrocarbyl substituent with a molecular weight of less than 500; wherein the hydrocarbyl substituent is a polymeric species consisting essentially of olefin monomer units of at least 3 carbon atoms; and

(II) at least one polyamine, wherein the polyamine is

(a) a polyalkylene amine containing at least one H-N< group; or

(b) a condensate of (i) a polyalkylene amine containing at least one H-N< group with (ii) at least one alcohol containing at least one ether group, amine group, nitro group, or additional alcohol group;

wherein in said polyamine (a) or condensed polyamine (b) no more than about 20 mole percent of the molecules contain 6 or fewer nitrogen atoms.

2. The composition of claim 1 wherein the substituent groups in (I) are derived from a polyalkene characterized by a  $\overline{M}_n$  value of about 1000 to about 10,000.

3. The composition of claim 2 wherein  $\overline{M}_n$  is at least about 2000.

4. The composition of claim 1 wherein the substituent groups in (I) are derived from one or more homopolymers or copolymers of olefins of 3 to about 16 carbon atoms.

5. The composition of claim 4 wherein the olefins are predominantly terminal olefins.

6. The composition of claim 4 wherein the substituent groups are derived from one or more homopolymers or copolymers of olefins of 3 to about 6 carbon atoms.

7. The composition of claim 6 wherein the substituent groups are derived from polybutene, polypropylene, or mixtures thereof.

8. The composition of claim 6 wherein the substituent groups are derived from polybutene in which at least about 50 mole percent of the monomer units are isobutylene units

9. The composition of claim 1 wherein the acylating agent is characterized by the presence within its structure of an average of at least about 1.1 succinic groups for each equivalent weight of substituent groups.

10. The composition of claim 1 wherein the acylating agent is characterized by the presence within its structure of an average of at least about 1.3 succinic groups for each equivalent weight of substituent groups.

11. The composition of claim 1 wherein within (I), no more than about 15 mole percent of the individual molecules have a hydrocarbyl substituent with a molecular weight of less than 500.

12. The composition of claim 1 wherein within (I), no more than about 10 mole percent of the individual molecules have a hydrocarbyl substituent with a molecular weight of less than 500.

13. The composition of claim 1 wherein within (I), no more than about 5 mole percent of the individual molecules have a hydrocarbyl substituent with a molecular weight content of less than 300.

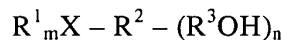
14. The composition of claim 1 wherein the alkylene moiety of the polyalkylene amine of (IIa) or (IIb) is ethylene.

15. The composition of claim 1 wherein for (IIa), less than about 10 mole percent of the polyamine molecules contain six or fewer nitrogen atoms.

16. The composition of claim 1 wherein for (IIa) less than about 5 mole percent of polyamine molecules contain six or fewer nitrogen atoms.

17. The composition of claim 1 wherein the alcohol of II(b)(ii) is of the formula





wherein:

X is O or N;

m is 1 when X is O and 2 when X is N;

each  $R^1$  is independently hydrogen, a hydrocarbyl group, a hydroxyhydrocarbyl group, or, if X is N, each  $R^1$  can be O so as to form a  $NO_2$  group;

$R^2$  is a hydrocarbylene group or an ether-containing group, having n+1 sites of linkage

$R^3$  is an alkylene group of 1 to about 4 carbon atoms; and

n is 1, 2, or 3.

18. The composition of claim 1 wherein the alcohol of II(b)(ii) is a di- or tri-ethanolamine.

19. The composition of claim 1 wherein the alcohol of II(b)(ii) is trimethylolpropane.

20. The composition of claim 1 wherein the alcohol of II(b)(ii) is pentaerythritol.

21. The composition of claim 1 wherein the alcohol of II(b)(ii) is tris(hydroxymethyl)amino methane.

22. The composition of claim 1 wherein the alcohol of II(b)(ii) is tris(hydroxyethyl)amino methane.

23. The composition of claim 1 wherein the alcohol of II(b)(ii) is a polyoxyalkylene alcohol.

24. The composition of claim 1 wherein within (IIb) the condensed polyamine is prepared by reacting about 1 to about 3 equivalent of the polyamine with 1 equivalent of the alcohol in the presence of an acid catalyst.

25. The composition of claim 1 wherein the nitrogen-containing dispersant is prepared by reacting (I) the hydrocarbyl-substituted succinic acylating agent with (IIa) the polyethylene polyamines.

26. The composition of claim 1 wherein the nitrogen-containing dispersant is prepared by reacting (I) the hydrocarbyl-substituted succinic acylating agent with (IIb) the condensed polyamine.

27. A method for reducing the formation of sludge and the degradation of seals in an engine, comprising lubricating said engine with the composition of claim 1.

28. (three times amended) A composition suitable for reducing engine sludge and degradation of elastomer seals comprising

a major amount of an oil of lubricating viscosity and

a minor amount of a nitrogen-containing dispersant wherein the nitrogen containing dispersant is a reaction product of

(I) a hydrocarbyl-substituted succinic acylating agent wherein the hydrocarbyl substituent is prepared from a polymeric species consisting essentially of olefin monomer units of at least 3 carbon atoms and wherein 15 to about 20 mole percent of the individual molecules of said polymeric species have a molecular weight of less than 500; and

(II) at least one polyamine, wherein the polyamine is

(a) a polyalkylene amine containing at least one H-N< group; or

(b) a condensate of (i) a polyalkylene amine containing at least one H-N< group with (ii) at least one alcohol containing at least one ether group, amine group, nitro group, or additional alcohol group;

wherein in said polyamine (a) or condensed polyamine (b) no more than about 20 mole percent of the molecules contain 6 or fewer nitrogen atoms.